DELAWARE CENTER FOR THE INLAND BAYS

Inland Bays Journal

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The Inland Bays Journal is a publication of the Delaware Center for the Inland Bays. The Center is a nonprofit organization and a National Estuary Program. The purpose of the Inland Bays Journal is to educate and inspire people about this estuary of national significance and its restoration.

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Cover photo: The James Farm Ecological Preserve is undergoing a transformation that will enhance visitors' learning experiences. Photo by Ken Sigvardson.

For decades, southern Delaware students, residents, and visitors have been creating magical moments at the James Farm Ecological Preserve. The Delaware Center for the Inland Bays, with generous assistance from partners and individual supporters, is working to ensure those opportunities are more easily accessible for generations to come.

The 150-acre Preserve, which is owned by Sussex County and managed by the Center, contains a diverse array of ecosystems, from maritime forests and wetlands to the serene sandy beach nestled along the Indian River Bay. It is a magnificent place for all ages to learn about the life of the Inland Bays and benefit from time spent along the coast.

In 2020, visitation at the Preserve markedly increased as more people found themselves seeking solace in the outdoors. Nearly 40,000 visitors came to the Preserve last year, which is an almost 300% increase from 2012. This demonstrates the Preserve's important role in residents' lives, as well as for the local tourism industry.

But outdoor recreation is not the only benefit the Preserve provides. Since 2000, the Preserve has been home to the Day on the Bay program, which provides experiential outdoor learning to students in the Indian River School District, many of whom represent underserved communities in Sussex County.

(continued on page 3)

A Rebirth of the James Farm Ecological Preserve

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FROM THE DIRECTOR

Lessons Learned in Nature Persevere

I still vividly remember every day I spent at nature camps as a child. I'll never forget days spent counting aquatic insects to learn about the health of a stream, learning to use bloodroot for decoration like the Lenni Lenape, and understanding anatomy by dissecting a squirrel. I remember every outdoor field trip that my classes took in school, as well, although I wish I could count them on more than one hand.

What made these outdoor education experiences so impactful and memorable? Was it just the novelty of getting out of the classroom? As an adult, I know it was more than that. The richness of the outdoor environment is known to stimulate students' intrinsic motivation to learn, which increases psychological fulfillment. That motivation, combined with the local experience offered by environmental education and the invaluable lessons taught by science experts, provides a powerful opportunity for learning about the world around us. And most importantly, environmental education is fun: it is solving real-world problems with your friends by getting up close with water, fish, bugs, soil, and all of the other learning tools just waiting to be found in nature.

The Center has provided outdoor environmental education to students through our Day on the Bay program at the James Farm Ecological Preserve for over 20 years. Our long-standing partnership with the Indian River School District has reached over 19,000 students with a full day of curriculum-aligned education. This spring, the Center has revived its intergenerational education programs at the Preserve by inviting the public to learn about coastal birds, horseshoe crabs, and native plants. Through the stewardship and connection to our coast that it engenders, our environmental education programs here are central to our mission of protecting and restoring the Bays.

These programs will be dramatically enhanced through the implementation of the James Farm Master Plan, which we present to you in this edition of the Inland Bays Journal. Our vision is for a Preserve with facilities that are as functional and beautiful as its ecosystems, so that we can provide a regionally-significant center for environmental education. And through the wonderful support of the Center's staff, Board of Directors, our Capital Campaign Committee, and generous donors, we are well on our way to realizing that vision. I hope that you enjoy learning along with us in this edition, and that you consider joining the families, foundations, and businesses that are supporting the Lessons in Nature Capital Campaign to implement the James Farm Master Plan.

Chris Bason
Executive Director

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DE Center for the Inland Bays

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(James Farm Ecological Preserve continued from page 1)

These images show a reimagining of the campus area, including a three-season education building, nestled near the forest. Illustrations by David D. Quillin.

When the Preserve was developed in 1998, facilities were not built to accommodate the growth in population and visitation that Sussex County is seeing today, nor the expanded educational programming needed to accommodate more students. Now it's time for the Preserve to grow in step with Sussex County in a way that rings true to the agricultural and natural history of this oasis along the Bay.

"The James Farm Ecological Preserve is already a beloved community resource, and our planned improvements will help realize its full potential as a place for quiet respite and a means to educate visitors about the natural wonders taking place in their own community," said the Center's Development Coordinator, Anna Short.

Families can enjoy a variety of activities at the Preserve, including clamming. Photos by J&J Photography.

A Master Plan for the Preserve is entering its second phase, which will include an experience-altering addition: the construction of a new, three-season education building. This addition will increase the capacity of the Day on the Bay program to soon reach up to 2,500 students and decrease program cancellations due to inclement weather, while updated interpretive signage and increased outreach to diverse groups will provide more opportunities for intergenerational programming.

Long-needed changes also include realignment of the existing trail system to improve visitor experience and adapt to sea level rise, permanent and ADA-compliant restrooms, and new maintenance facilities that will provide storage and workshop space to better care for the Preserve and support the Center's watershed-wide restoration efforts.

These efforts are supported by the Lessons in Nature capital campaign, which is now seeking donations and in-kind support from the community. To date, generous funding has been provided by Sussex County Council, Crystal Trust, The Starrett Foundation, the Outdoor Recreation, Parks and Trails Program, Sussex County state legislators, local businesses, and individual donors.

To learn more or to support the efforts to improve and enhance the Preserve, go to inlandbays.org/james-farm-master-plan or contact Anna Short at ashort@inlandbays.org.

High-Tech Monitoring Sheds Light on Pollution Problems

On August 13, 2020, about 2,000 juvenile menhaden were killed due to a drastic drop in oxygen levels in the upper Indian River near Possum Point.

A water quality monitoring instrument placed in the river by Center scientists confirmed that oxygen depletion due to an algal bloom led to that unfortunate event. The instrument is part of a new, expanding network of monitoring stations in the Inland Bays that record water quality conditions every 30 minutes, 24 hours a day.

Before using that instrument, most water quality data from the river came from single samples collected weekly or monthly, and low-oxygen events like this one often were missed. Continuous monitoring data, however, shows daily fluctuations in water quality.

Dissolved oxygen is the amount of oxygen in the water available to aquatic organisms, such as fish and shellfish. Excess nutrients, such as nitrogen and phosphorus from wastewater and fertilizers, lead to algal blooms, which in turn deplete the dissolved oxygen.

When oxygen levels drop for a short period of time—a few minutes or an hour—only some of the aquatic animals in the area have the ability to move to healthier waters.

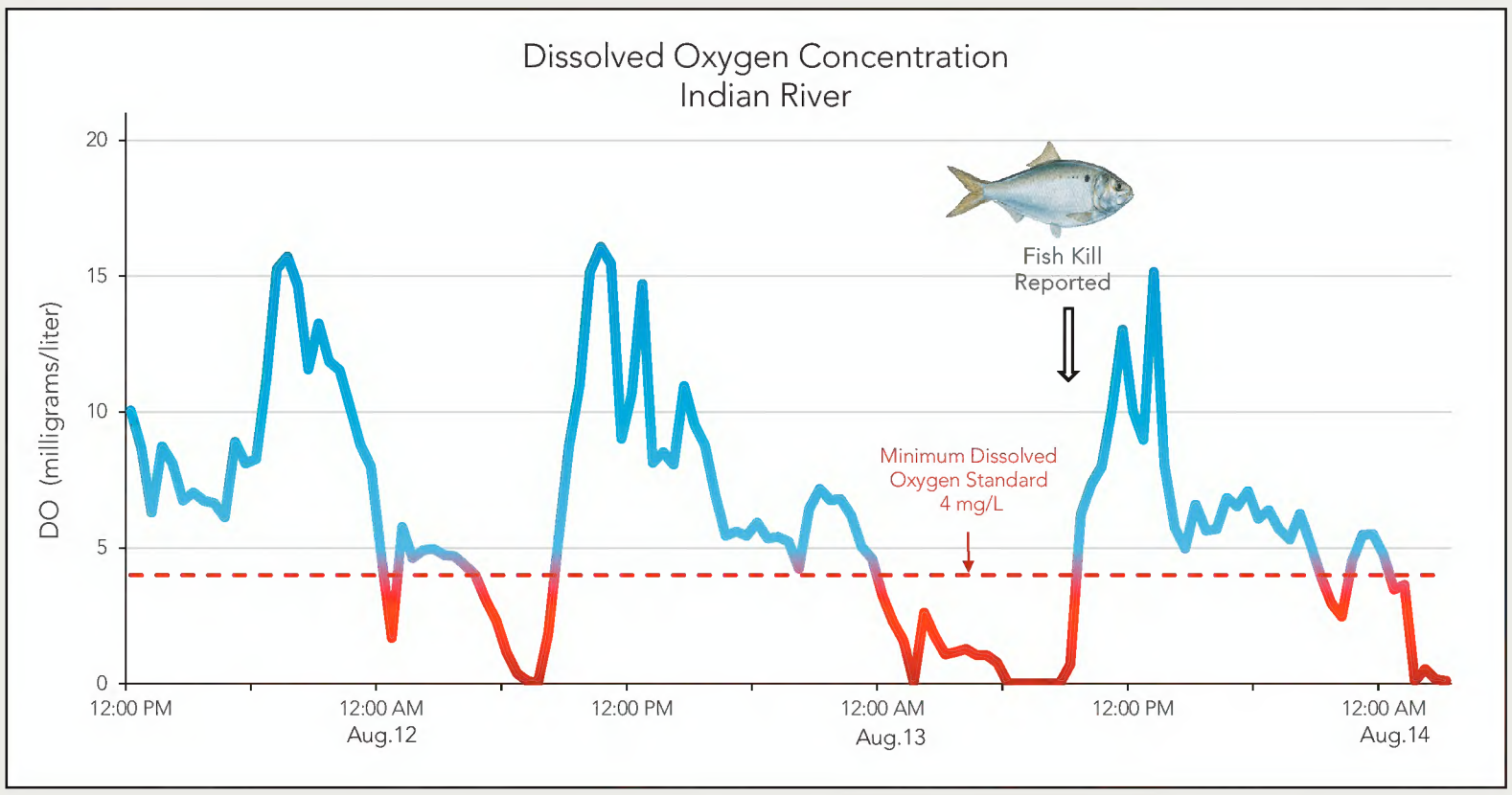
"But when dissolved oxygen is low for a whole night, that's really concerning," said Dr. Marianne Walch, the Center's Science & Restoration Coordinator.

The state's minimum standard for dissolved oxygen is 4 milligrams per liter of water, but many species such as striped bass and blue crabs need even more oxygen to thrive. If that oxygen isn't available, neither are those valuable species.

The Center's data show that, unfortunately, conditions like those seen on August 13 are not isolated events.

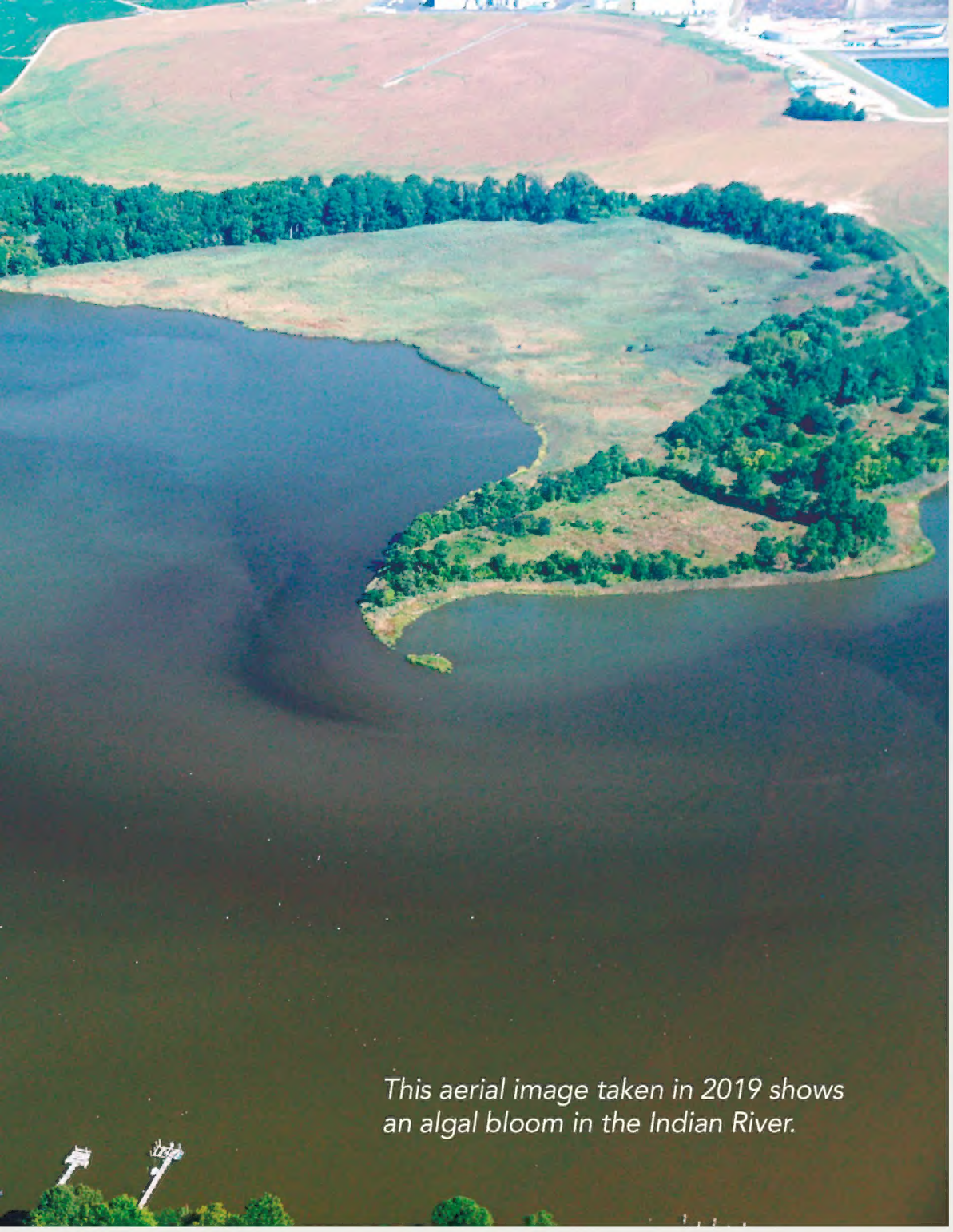
Between June 1, 2020, and October 1, 2020, oxygen levels in the upper Indian River failed to meet the state water quality standard on 75% of mornings. On five occasions, dissolved oxygen levels remained below that healthy limit for 8 hours or longer.

The Center currently collects oxygen, salinity, water clarity, pH, and temperature data from three continuous monitoring stations: two in the upper Indian River and one in Pepper Creek.



The Center has partnered with the University of Delaware on this project, with plans to install two more stations in 2021 in other parts of the Bays. Additional stations are planned for 2022, and will help the Center learn more about the true state of water quality in the most polluted tributaries of the Inland Bays in order to educate the public and advocate for the resources needed to protect and restore their water quality.

This graph shows the change in dissolved oxygen levels over a short period of time in August 2020.



This aerial image taken in 2019 shows an algal bloom in the Indian River.

Lessons Learned from a Disaster Along Indian River

Despite decades of regulatory and voluntary efforts to restore the quality of Indian River and Swan Creek, these waterways remain highly polluted. Data now show severe pollution problems persist.

The Indian River is arguably the most productive of all the waterways in the Inland Bays, serving as a nursery for economically important species such as blue crab and summer flounder. It is formally considered to be a waterway of "Exceptional Recreational and Ecological Significance," requiring the highest level of protection and restoration under the state's water quality standards. But these vital resources are crippled by annual algal blooms driven by high levels of nutrient pollution.

Four years ago, the public learned of the failure of Mountaire Farms' poultry processing plant's wastewater treatment system located along those waterways as neighbors were warned that their drinking water may be contaminated. Wastewater containing alarming levels of nitrogen, phosphorus, and bacteria was bypassing required treatment and being sprayed onto nearby fields, which sit atop the same aquifer that feeds nearby wells and those Inland Bays tributaries.

It has taken years of active involvement from residents, scientists, and lawyers to strengthen and finalize solutions that will improve Mountaire's operations moving forward. Mountaire plays an important role in Sussex County's economy by providing local jobs and food. They're now reinvesting more than $120 million in their facility to reduce pollution levels and meet safe drinking water standards, as required under a new operating permit.

Meanwhile, an agreement called a "consent decree" between Mountaire and the Delaware Department of Natural Resources and Environmental Control (DNREC) orders the company to pay fines and increase monitoring efforts. The consent decree also requires Mountaire to pump the most contaminated groundwater, treat it for excess nitrates, and return it to the aquifer in a cleaner state. For a 30% reduction in fines, the company must also ensure the most impacted residents have access to clean drinking water.

In the wake of the waste-related violations coming to light, the Center investigated and educated the public about the historical wastewater permit violations and lax enforcement by state and federal regulators at this site, dating back to 2004. The Center's report was cited in legal proceedings, which ultimately resulted in two settlements benefitting hundreds, possibly thousands, of Mountaire's neighbors, including a $65 million class-action settlement.

The Center also provided extensive comments on the draft consent decree and the permit applications. While requests to add limits on phosphorus levels in wastewater and better control of additional fertilizer applications were acted upon, many of the Center's most important recommendations were not.

The company will be permitted to spray wastewater containing 10 milligrams per liter of nitrogen, which is twice the amount the Center recommended. There was no assessment required to show how continued applications of wastewater would allow Indian River and Swan Creek to reach their state-mandated water quality standards.

The damage to these waterways has been done, and environmental impacts will be felt for years to come. The question of what can be done to prevent even more pollution from entering the river and creek remains, despite the technical and legal culmination of this ordeal.

"History tells us that unless we have thorough inspection and enforcement from regulators backed by a public that is incessant in their demands that environmental protections be enforced, this will happen again," said the Center's Executive Director, Chris Bason. "If not on this river or in this community, then somewhere else."

Going forward, the Center will continue to expand its water quality monitoring of the Indian River and share its results. It will also seek to work with Mountaire to develop and implement additional solutions to restore the quality of Swan Creek and Indian River.

Building Meaningful Connections: Why the Center Prioritizes Environmental Education

Public programs have been limited during COVID-19, but the Center is finding new ways to engage all ages.

By the time winter arrived last year, many people were already tired of being cooped up at home with nothing but screens to keep them entertained. But the Center saw an opportunity to embrace the challenge and turn it into a new partnership benefiting Delmarva students.

During July 2020, the Maryland Coastal Bays Program, another of the 28 National Estuary Programs, hosted a virtual education program for youth called "Bring the Bays Home." In December 2020, the project crossed state lines through a collaboration with the Center and became "Journey Up the Coast: A Virtual Exploration of the Inland and Coastal Bays." Even though the program took place behind a computer screen, activity boxes complete with magnifying glasses, nature journals, and supplies for fish adaptation and wetland filtration lessons were shared with 33 participating students, allowing for a hands-on learning experience.

"There are a bunch of virtual education programs out there, but few are offered where the students can follow along with the lesson materials right in front of them. Providing an interactive program like this really opened my eyes to how inclusive it can be," said Liz Wist, Education Coordinator at the Maryland Coastal Bays Program. "By working virtually with activity boxes, environmental educators can reach those who may not normally be able to attend in-person events due to illness, disability, or other obstacles to access."

The program not only attracted students ages 8-13 from Delaware and Maryland, but also had participants from Missouri, New York, and Pennsylvania! "Journey Up the Coast" returns in person for the first time this June, offering up to 80 students an immersive learning experience at the James Farm Ecological Preserve.

"This partnership is growing and allowing us to pool our resources, skill sets, and passions," said Lisa Swanger, the Center's Outreach & Education Coordinator. "It's fantastic to watch the students get engaged. We have a responsibility to educate them, inspire them, and help bring to light our interconnectedness with the environment."

In 2021 and beyond, the Center will increase the reach of its environmental education efforts by offering more programs like these through new partnerships with local schools like Sussex Academy.

But programming for students isn't the only way the Center is reconnecting people to the natural world. As everyone got used to a "new normal" during the COVID-19 pandemic, the Center launched a series of outdoor public programs at the Preserve. Guided tours focus on teaching people about this 150-acre collection of ecosystems, native plants and wildlife, how to help protect the Inland Bays, and more!

In March, April, and May, the weekly programs attracted more than 185 people to get outside and learn something new. The Center also is increasing efforts to reach diverse communities throughout the watershed by working with new organizations and offering materials in Spanish.

We hope you visit us at inlandbays.org/publicprograms to see what programs are happening this summer and fall!

Jared Ryan, the Center's Environmental Educator, teaches visitors about species found in the forest.

Students from Sussex Academy participate in an on-campus field visit.

Nori made select appearances during "Journey Up the Coast."

DONOR SPOTLIGHT:
Diane Hanson Shows Why We Should All Dive in Feet First

Decades ago, a simple experiment plunged Diane Hanson feet-first into the importance of water quality and the Inland Bays.

Well, technically, it was former Governor Ruth Ann Minner doing the plunging. Diane watched as the Governor waded into Rehoboth Bay near the Rusty Rudder with white sneakers still on her feet. The idea was to measure how far she could get into the Bay before losing sight of her white shoes, to unofficially gauge water clarity.

"It was such an unusual introduction that I never forgot it or its message about pollution in the Bay," said Diane, an avid supporter of the Center's work and the Lessons in Nature capital campaign.

Now Diane lives just a block away from the Bay, and cherishes it daily. She often joins her husband, Bill, and their dog, Willie, to walk the short distance to the beach where they can enjoy the beauty of its sparkling waters and stunning sunsets.

As the former mayor of Dewey Beach, where she served as an elected official for a decade, Diane fostered a relationship with the Center for the Inland Bays. She would often seek the expertise of the Center's scientists on everything from flooding and erosion to pollution issues.

"I served on the Center's Board of Directors as a representative of the Sussex County Association of Towns, and I was a liaison between the two organizations to ensure that we worked together for the betterment of the community," she explained.

> **"The scientists that I've worked with are sincerely interested in the environment. They are knowledgeable, creative, and they are very supportive in helping our local towns."**

She has now seen the completion of Center-led projects along Read Avenue in Dewey Beach, which have successfully reduced flooding and stopped excess pollution from reaching the Bay.

Diane has found a new way to remain involved in the health of the Bays and her Dewey Beach community by becoming a dedicated volunteer, advocate, donor, member of Lessons in Nature Steering and Major Gifts committee supporting educational programming at the James Farm Ecological Preserve, and all-around supporter of the Center and its work.

Over the years, Diane has enjoyed watching the Preserve, which she also enjoys exploring with her husband and dog, evolve and grow.

"It is a wonderful combination of nature and wildlife nestled along the Bay, and it is a great place to relax and enjoy the beauty of our world," she said.

Understanding how important it is for people to connect with nature at an early age has led Diane to become one of the Center's most valued supporters of the Lessons in Nature capital campaign.

Through her work garnering more support for the Campaign, Diane has come to realize how many people have lacked access at young ages—herself included—to the immersive educational experiences like those provided at the Preserve. That has inspired her to truly "Get on Board with the Bays" and support the Center's mission.

"This project will help kids in our area to be more knowledgeable about nature, about climate change, about animals, and how we as humans should be their stewards to ensure that the wildlife have sufficient food and clean water to survive," Diane said. "Contributing to this local cause has enriched my life, as well as that of others."

DELAWARE CENTER FOR THE
INLAND BAYS
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THE CENTER'S MISSION

To preserve, protect, and restore Delaware's Inland Bays and their watershed.

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Live Art Auction in partnership with Gallery One to benefit the Lessons in Nature at the James Farm Ecological Preserve capital campaign

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Tickets on Sale in July! Contact Anna Short at ashort@inlandbays.org for more information.